Ultimate Guide to Patient Diagnosis and Case Studies

Brain Resource Guide by Simply Neuroscience

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Huntington's Disease

Overview:

- Inherited disease that occurs in the family
- Causes brain atrophy, which occurs when certain nerve cells in the brain die
- Symptoms most commonly begin around the 30s or 40s
- Patients usually live 15-20 years after being diagnosed

Photo courtesy of express.co.uk

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Huntington's Disease

<u>Symptoms:</u>

Early Symptoms:

- Psychosis
- Uncontrolled movements, such as quick, sudden jerking movements of the limbs and face (known as chorea)
- Balance problems

Advanced Symptoms:

- Inability to walk, talk or swallow
- More uncontrolled movements, such as face and body organs
- Some patients also develop dementia and personality changes

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Huntington's Disease

Diagnostic Tests:

- Blood test and DNA test would indicate that the Huntington gene is abnormally duplicated, located on chromosome 4
- Reflex evaluation: abnormal
- Memory and Intelligence tests: can be abnormal in advanced stages
- Motor Evaluation: abnormal
- CT Scan and MRI: loss of brain tissue, particularly in the caudate nuclei and stratum

Parkinson's Disease

Overview:

- Second most common neurodegenerative disorder
- Tends to affect men more than women
- Dopaminergic neurons in the substantia nigra die
- Average onset of symptoms around age 60
- Many patients live for 10 to 20 years after diagnosis

Photo courtesy of parkinson.org

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Parkinson's Disease

Symptoms

Early Symptoms

- Often begin on one side of the body and eventually spread to both sides
  - Trembling of hands, arms, legs, jaw and face
  - Stiffness of the arms, legs and trunk
  - Slowness of movement
  - Poor balance and coordination

Later Symptoms

- Trouble walking, talking, or doing simple tasks
- Patients may even have problems such as depression, sleep problems, or trouble chewing, swallowing, or speaking.

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Parkinson's Disease

Diagnostic Tests:

- Medical history of symptoms
- Neurological and physical examinations: slow, rigid movements
- Dopamine transporter (DAT) scan: abnormally low
- Lab tests (e.g. blood tests) and imaging tests (MRI, CT, ultrasound, PET scans, etc.) can be used to rule out other disorders
- A sufficient dose of levodopa, a Parkinson’s disease medication, that ameliorates symptoms often confirms a diagnosis

Alzheimer's Disease

Overview:

- Alzheimer’s is a type of dementia that usually occurs in old age, causing problems with memory, thinking and behavior due to irreversible mental deterioration (neurodegeneration).
- Caused by progressive brain cell death; over time, an Alzheimer’s patient’s brain tissue has fewer and fewer nerve cells and connections.
- Greatest known risk factor is increasing age - majority of people with Alzheimer's are 65+.
    - However, about 200,000 Americans under the age of 65 have younger-onset/early-onset Alzheimer’s disease.
- On average, a person with Alzheimer's lives 4-8 years after diagnosis, but can live as long as 20 years, depending on how fast the brain deteriorates.

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Alzheimer's Disease

Symptoms

- Early symptoms:
  - Difficulty remembering newly learned information
  - Memory loss that disrupts daily life
  - Challenges in planning/solving problems
  - Difficulty completing familiar tasks
  - Confusion with time/place
  - Trouble understanding visual images & spatial relationships
  - New problems with words in speaking/writing
  - Misplacing things & losing ability to retrace steps
  - Decreased or poor judgment
  - Withdrawal from work or social activities
  - Changes in mood and personality
- Later Symptoms
  - Increased susceptibility to infections
  - Difficulty walking & moving
  - Loss of communication through words
  - Groaning, grunting, and moaning
  - Difficulty swallowing & eating
  - Weight loss
  - Total incontinence of bowel and bladder
  - Increased sleeping
  - Inability to sit up or hold up one's head
  - Loss of facial expressions (such as smiling)
  - Seizures
- Late-stage symptoms are fatal when patients can no longer be fed or breathe safely.

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Alzheimer's Disease

Diagnostic Tests:

- **Neurological Exam:**
  - Tests reflexes, coordination, muscle tone, strength, eye movement, speech, and sensation
- **Mental Status Test:**
  - evaluates memory & ability to solve simple problems - test is given to find out if patient is aware of symptoms, knows the date, time, where he/she is, and can remember a short list of words, follow instructions, and do simple calculations.
- **MMSE (Mini-Mental State Examination)**
  - patient is asked questions designed to test a range of everyday mental skills; (max score is 30 points, score of 20-24: mild dementia, 13-20: moderate dementia, ≥12: severe dementia).
- **Mini-Cog Test**: patient is asked to do the following
  - remember and a few minutes later repeat the names of three common objects.
  - draw a face of a clock showing all 12 numbers in the right places & identify times
- **Brain Imaging**

Bipolar Disorder

Overview:

- A mental health condition that causes extreme mood swings, including emotional highs (called manic episodes) and lows (called depressive episodes)
- Cause unknown; factors include genetics (the likelihood of bipolar disorder diagnosis is increased with family history of the disease) and biological differences in the brain
- Early-onset bipolar disorder → symptoms begin between ages 6-19
- Late-onset bipolar disorder → symptoms begin around age 40
- People diagnosed with bipolar disorder have a lifespan 9-20 years shorter than average

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Bipolar Disorder

Symptoms

Manic

- Increased activity or energy
- Decreased need for sleep
- Poor decision-making
- Loss of appetite
- Feeling “high”, elated, irritable
- Racing thoughts and fast speech

Depressive

- Increased appetite
  - (weight gain as a result)
- Trouble concentrating
- Little interest in any activities
- Unable to experience pleasure
- Thoughts of death or suicide
- Feelings of restlessness

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Bipolar Disorder

Diagnostic Tests:

- A physical examination is done to make sure the symptoms have no physical cause
- A discussion w/ a psychiatrist or psychological self-assessment. Discussions typically consist of the following:
    1. Questions about recent mood swings and mood charting
        - They may also ask family members about symptoms
    2. Comparison of described symptoms with those on the Diagnostic and Statistical Manual of Mental Disorders (published by the APA)
        - Outlines general symptomatic criteria for bipolar disorder

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Schizophrenia

Overview:

- Mental disorder that makes it difficult to tell what is real and what is not.
- Unknown cause but it is likely that genes are involved.
- Mostly affects teens and young adults but may occur later in life. Childhood schizophrenia is very rare.
- Affects both men and women; however, in women, the disease tends to occur later and is usually mild.
- Schizophrenic patients are expected to live about 70% of the normal lifespan. It is unclear if the reason behind this lifespan reduction is psychological or pathological. Studies show an increase in both natural (cancer, CV disease) and unnatural (suicide, accidental death) causes.

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Schizophrenia

Symptoms

- Early Symptoms
  - Irritable/tense feelings
  - Inability to sleep
  - Inability to concentrate
- Later Symptoms
  - Hallucinations (hear and see things that are not real) and delusions (strongly held beliefs that are not real)
  - Isolation
  - Reduced emotion
  - Poor decision making and understanding
  - Inability to pay attention
  - Incomprehensible speech

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Schizophrenia

Diagnostic Tests:

- No medical test to diagnose, psychiatrist will interview patient and family.
- May look at brain scans (CT or MRI) and blood tests to rule out other conditions with similar symptoms.
- Psychological testing will usually be varied in order to determine whether the three most common symptoms of schizophrenia are present. These include:

1. Positive symptoms (i.e. hallucinations, delusions)
2. Negative symptoms (i.e. lack of emotion, poor social functioning)
3. Cognitive symptoms (disorganized thoughts, difficulty concentrating, memory problems)

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Autism

Overview:

- “A variable developmental disorder…characterized especially by difficulties in forming and maintaining social relationships, by impairment of the ability to communicate verbally or nonverbally, and by repetitive behavior patterns and restricted interests and activities” - Merriam Webster
- The cause of autism is unknown but there are theories such as
    - Genetic mutations
    - Problems with brain connections & overgrowth in certain regions
    - Issues w/ metabolism or the immune system
- Symptoms develop between 12-18 months old
    - Most children are not diagnosed until ~3 years old
- Autism itself does not affect the lifespan of a patient
    - Bullying, social issues, side effects from medication, etc. shortens the patient's average lifespan by about 16 years. One common cause of death for people with autism is suicide

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Autism

Symptoms

- Doesn’t respond to social or emotional cues
- Doesn’t follow directions
- Cannot explain wants or needs
- Poor eye contact
- Tunes out others- ex. other children when playing or their parent’s voice
- Repetitive behavior patterns- ex. sticking to a routine, restricted interests, unusua
  sensory responses
- Sensitive to noise
- Walks on their toes
- May throw violent tantrums/meltdowns

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Autism

Diagnostic Tests:

- Developmental screening
  - A PCP will interact with the child and converse with the parents to find if the child lacks or has delays in the way they learn, talk, move, and play.
  - Children are screened for autism at the ages of 18 months and 24 months
    - This should be done more often if they are at a higher risk for autism)
- Comprehensive diagnostic evaluation
  - The evaluation is the second step where behavior and development are further analyzed through
    - Hearing screening
    - Vision screening
    - Genetic testing
    - Neurological testing
    - Other diagnostic tools
  - Parents will provide observations of their child

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Epilepsy

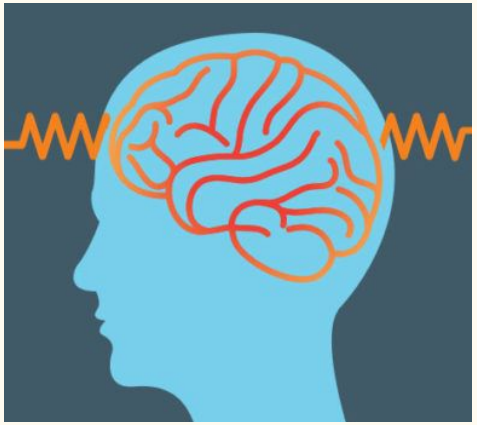
Overview:

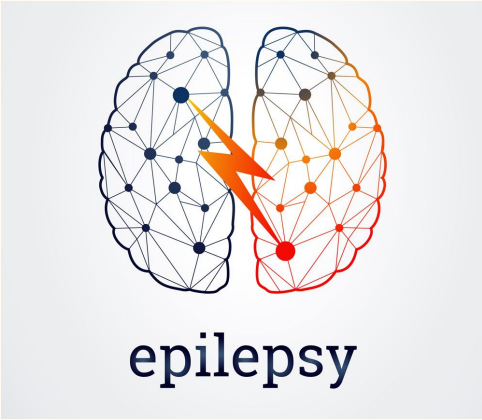
- A central nervous system disorder characterized by recurring seizures, inappropriate sensations, emotions, and behavior

- The exact causes of epilepsy are unknown
  - Potential causes include: illness, brain injury, and genetics

- Most commonly diagnosed in young children and older adults

- Predicted 2-10 year reduction in life expectancy at the time of diagnosis (Gaitatzis et al., 2004)





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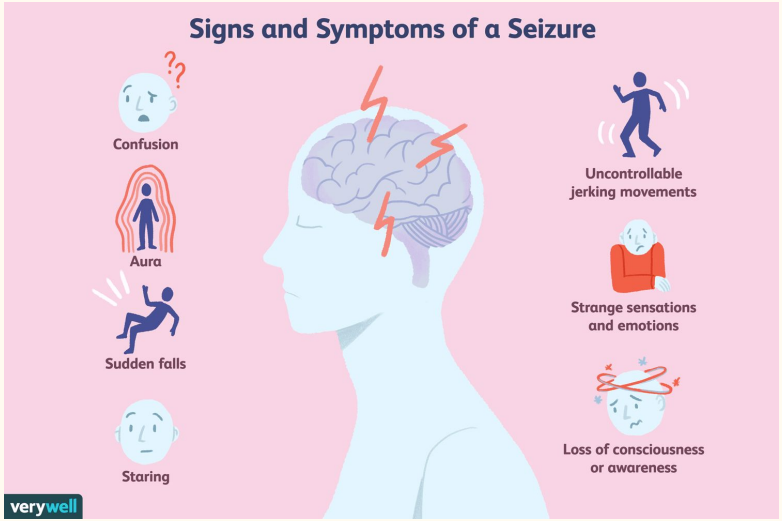
Epilepsy

Symptoms

- Epilepsy is most often associated with unprovoked seizures

- Warning signs of a seizure include:
  - A temporary state of confusion
  - A staring spell (no eye movement)
  - Uncontrollable movement of the limbs
  - Loss of consciousness
  - Fear and anxiety



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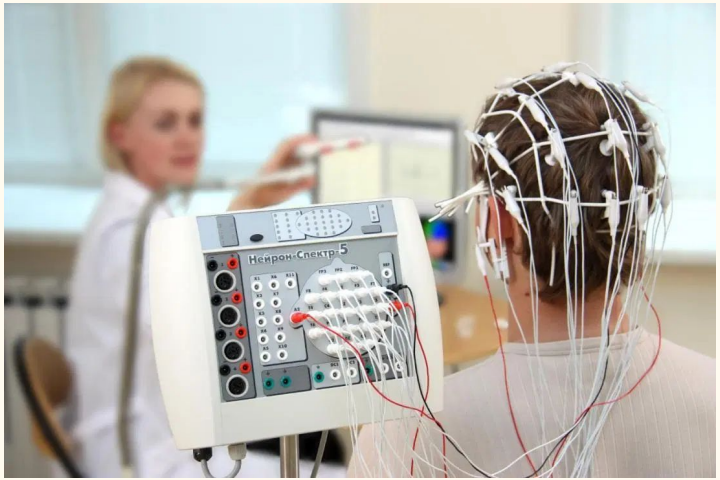
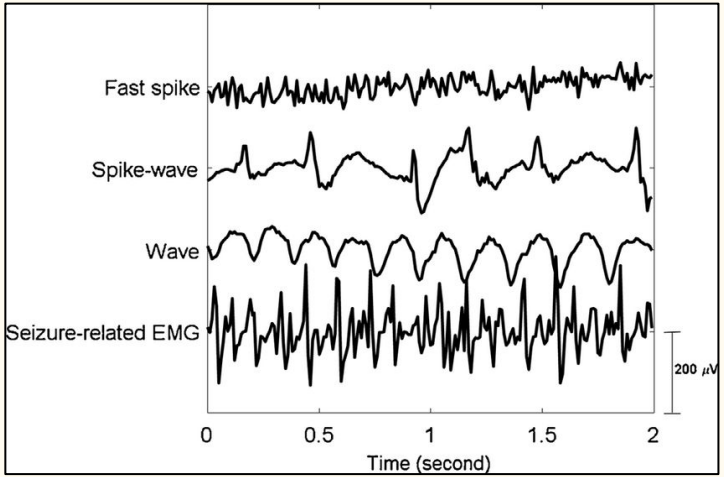
Epilepsy

Diagnostic Tests:

- Clinical evaluation
- Consideration of family history
- EEG (electroencephalogram) testing
  - Used to identify abnormal brain activity





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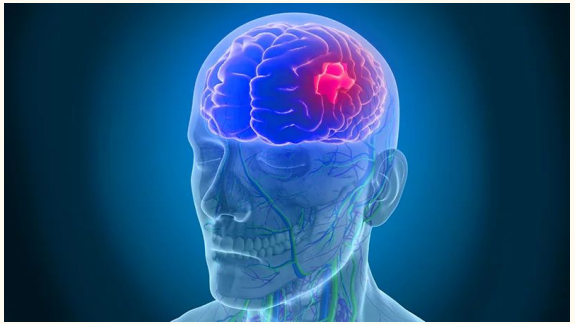
Stroke



Overview:

- Occurs when blood flow to a part of the brain is blocked or reduced, resulting in dying or damaged tissue
    - Blood flow is blocked either due to a blocked artery or a leaking/bursting blood vessel
- Strokes can occur without warning, but they are medical emergencies and immediate treatment is required.
- Effective treatments and more awareness have lowered the number of stroke related deaths in America

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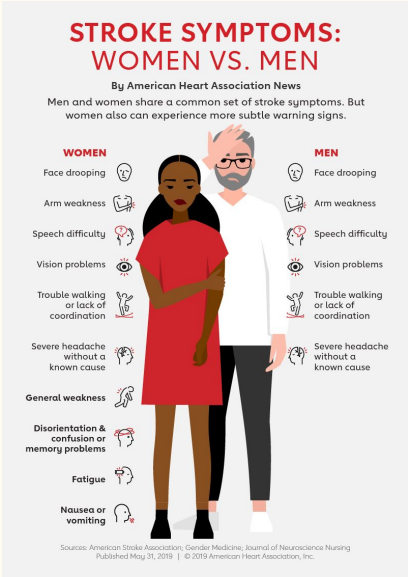
Stroke

Symptoms

- Paralysis or numbness in the face, arm, or leg
- Trouble speaking
- Trouble understanding what others are saying
- Trouble with vision
- Headaches
- Dizziness, Loss of balance, or loss of coordination



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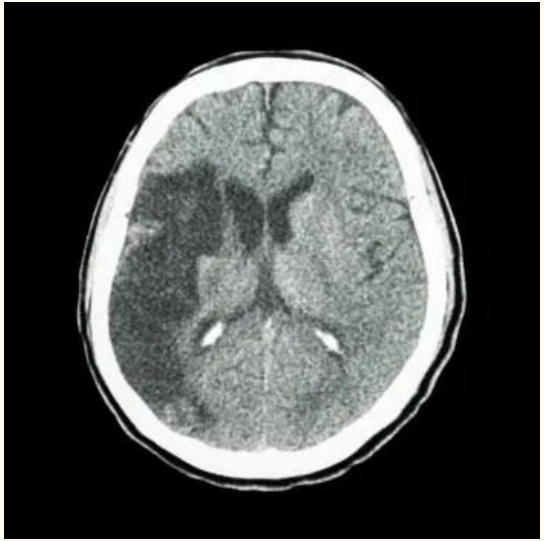
Stroke

Diagnostic Tests:

- CT Scan: A CT scan uses x-rays to create a detailed image of your brain. This image shows bleeding in the brain, tumors, and other conditions.
- Echocardiogram: An echocardiogram uses sound waves to create an image of your brain, which can then be used to find clots in the heart that could have traveled to the brain and caused a stroke.
- MRI: A test that uses magnets to create a picture of an area inside the body. In the case of the stroke, an MRI is used to detect damaged tissue after a stroke.



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Multiple Sclerosis

Overview:

- A potentially disabling disease caused by the immune system attacking the myelin sheath of nerves in the central nervous system
- Nerve damage results in mobility issues--commonly losing the ability to walk
- Most cases involve a relapsing-remitting cycle where the patient will improve and relapse repeatedly
- Unknown Cause; scientists believe it's a combination of environmental and genetic factors
- Symptoms usually start between 16-50 years old
- Average lifespan of 25-35 years after diagnosis

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Multiple Sclerosis

Symptoms:

Varies by person, but the symptoms usually worsen over time and include:

- Numbness or weakness in limbs -- often happens to one side of body at a time
- Lack of coordination
- Imbalance in gait
- Slurred speech
- Vision deterioration
- Fatigue and depression
- Involuntary muscle spasms (Spasticity)

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Multiple Sclerosis

Diagnostic Tests:

- No specific test for MS
- Rule out similar diseases by examining symptom patterns and using blood tests, MRI, and spinal tap
- If medical history and symptom patterns correlate with MS pattern trends, a thorough examination is conducted and may result in a diagnosis

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Amyotrophic Lateral Sclerosis

Overview:

- Also known as Lou Gehrig's disease
- Motor neurons die, preventing them from sending messages to muscles
- Leads to muscle weakening, twitching, and inabilities to move the arms, legs, and body
- Affects 5 out of every 100,000 people worldwide

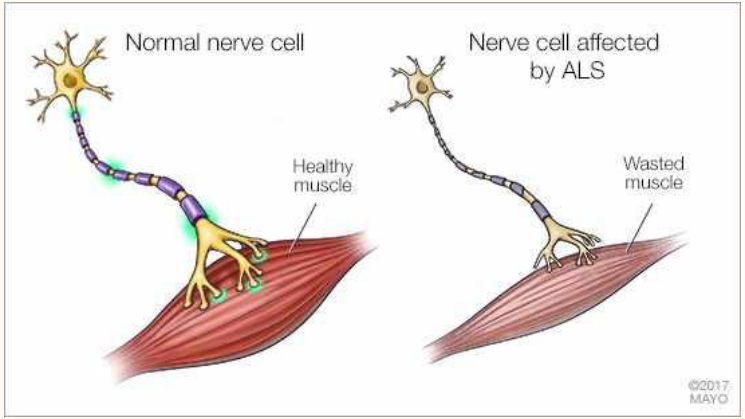

Photo courtesy of Mayo Clinic News Network

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Amyotrophic Lateral Sclerosis

Symptoms:

- Usually do not develop until age 50
- Loss of muscle strength and coordination
- Difficulty in motor tasks (going up stairs, getting off chairs, etc.)
- Difficulty breathing
- Difficulty swallowing -- choking easily, drooling, or gagging
- Head drop due to weakness of the neck muscles
- Speech problems and voice changes, hoarseness
- Muscle cramps, stiffness, or contractions

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Amyotrophic Lateral Sclerosis

Diagnostic Tests:

- Cervical spine CT or MRI (can ensure that there is no disease or injury to the neck, which can mimic ALS)
- Electromyography (can see which nerves or muscles do not work properly)
- Head CT or MRI
- Swallowing studies
- Spinal tap (lumbar puncture)

Rett Syndrome

Overview:

- More commonly occurs in girls, and rare in boys
- A rare, non-inherited genetic postnatal disease that causes developmental and nervous system problems
- Symptoms develop in children aged between 6-18 months old
- Patients generally live into their middle ages, but may require constant care

Courtesy of https://www.gillettechildrens.org

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Rett Syndrome

Symptoms:

- Loss of speech
- Loss of hand movements such as grasping
- Compulsive movements such as hand wringing
- Balance problems
- Breathing problems
- Behavior problems
- Learning problem/intellectual disability
- Loss of muscle tone (hypotonia)
- Sleeping problems

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Rett Syndrome

Diagnostic Tests:

- **Genetic Test:** determines the presence of a rare mutation in the *MECP2* gene on the child's X chromosome
- **Physical Test:** identifies early signs and symptoms during early development; diagnosis is based off of 3 categories of symptoms:

Essential Symptoms
(must be present - high chance)

- Normal development, followed by loss of skills 6 to 18 months into development
- Partial/complete loss of hand skills + spoken language
- Repetitive hand movements

Supportive Symptoms
(can be present - some chance)

- Teeth-grinding
- Abnormal sleep patterns
- Scoliosis/kyphosis (curvature of the spine)
- Abnormal muscle tone (hypotonia)
- Intense eye pain

Exclusion Symptoms
(rules out Rett syndrome)

- Neurometabolic disease or other inherited degenerative disorder
- Neurological disorder resulting from severe infection or head trauma
- Evidence of brain damage after birth

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Spinal Cord Injury (SCI)

Overview:

- The spinal cord relays messages to and from the brain.
  - When the spinal cord is injured, neurons face damage that temporarily or permanently changes their function.
- SCI is caused by diseases (e.g, polio, spina bifida), motor vehicle accidents, sports-related injuries, and physical assault.
- Symptoms may be delayed, or may present themselves immediately after injury.
- The life expectancy of a patient depends on:
  - The severity of the injury
  - The patient's age

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Spinal Cord Injury (SCI)

Symptoms may include:

- Pain or numbness
- Inability to move or walk
  - Leads to long-term paralysis
- Inability to feel pressure or temperature changes
- Muscle spasms
- Lack of bladder or bowel control
- Difficulty breathing

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Spinal Cord Injury (SCI)

Diagnostic Tests:

- To diagnose an SCI, a patient undergoes a respiratory and neurological evaluation immediately after trauma.
- Computerized tomography scans (CT scans) identify injuries.
- Magnetic resonance imaging (MRI) identifies blood clots, herniated disk, and masses compressing the spinal cord.

MRI Scan Image

CT Scan Image

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Prion Diseases – Creutzfeldt-Jakob disease

Overview:

- Creutzfeldt-Jakob disease (CJD) is a neurodegenerative disorder that leads to dementia, and eventually death.
- CJD, while similar to other neurodegenerative disorders, may progress faster and always leads to death.
- It is believed that CJD is caused by prion proteins. These are misfolded proteins that damage healthy brain cells.
- An estimated one in a million people suffer from CJD.

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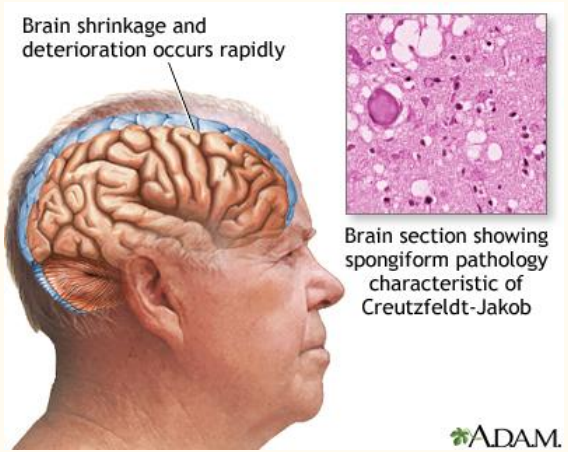
Prion Diseases – Creutzfeldt-Jakob disease

Key Symptoms:

- Personality changes
- Depression
- Loss of memory
- Weakened thinking ability
- Blindness or blurry vision
- Difficulty sleeping
  - Insomnia
- Difficulty with normal movement
  - Jerky movements



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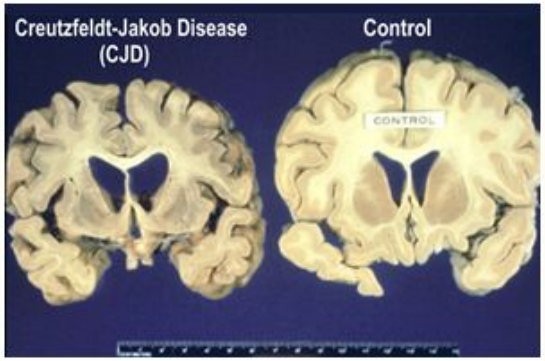
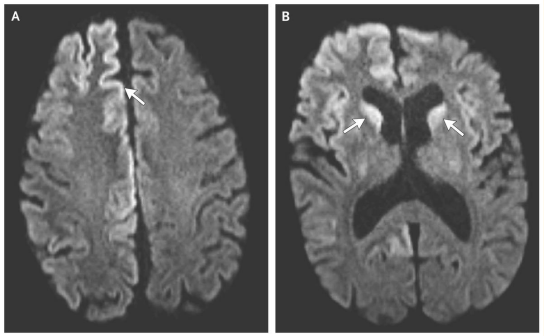
Prion Diseases – Creutzfeldt-Jakob disease

Diagnostic Tests:

- The only way to confirm the presence of CJD is through a brain biopsy or an autopsy.
- An accurate diagnosis can often be made through a neurological exam, where symptoms such as eye twitching, muscle spasms, and abnormal reflexes can indicate the presence of CJD.
- Diagnostic tests such as spinal fluid tests, MRIs, or an electroencephalogram can also help indicate CJD.





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Down Syndrome

Overview:

- Down Syndrome is a genetic disorder that is caused when there are two copies of Chromosome-21.
- The severity of Down Syndrome varies greatly, and different individuals can show different symptoms
- It is the most common chromosomal condition, with 1 in every 691 babies being born with it.
- Down Syndrome can lead to several other health complications, such as heart defects or sleep apnea.

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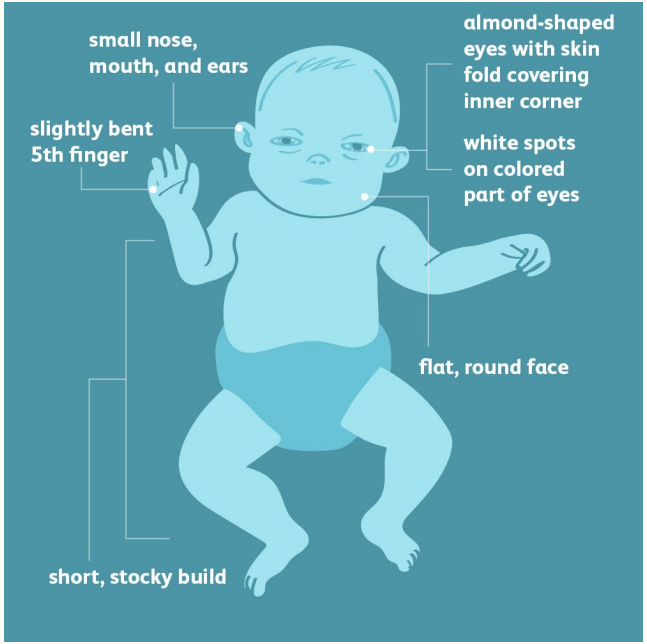
Down Syndrome

Symptoms:

- Flattened face and Small Head
- Short neck and Height
- Intellectual disability (Low IQ)
- Irregular Speech and communication skills
- Upward slanting eyelids
- Excessive flexibility
- Incomplete development of vital organs
- Small hands and feet



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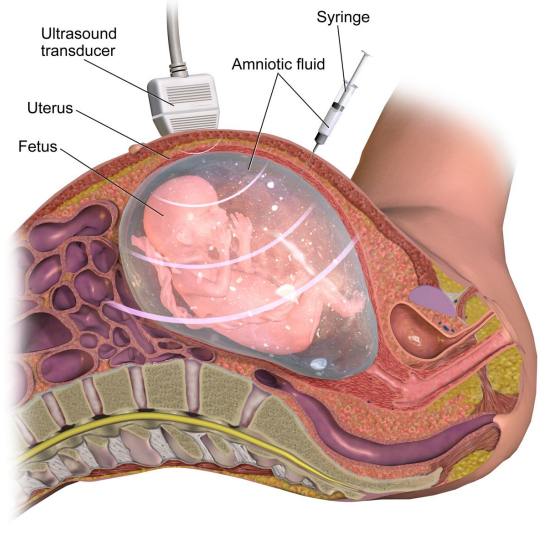
Down Syndrome

Diagnostic Tests:

- **Amniocentesis:** Amniotic fluid surrounding a pregnant woman's uterus is taken, and the fetal chromosomes are analyzed. This test is usually performed during the 2nd trimester of pregnancy.
- **Appearance:** After pregnancy, the baby is usually diagnosed with Down Syndrome based on the distinct, easily identifiable look attributed to Down Syndrome.
- **Chromosomal Imaging:** This test is done after birth to confirm the diagnosis of Down Syndrome. The baby's chromosomes are analyzed via a blood sample. If an extra Chromosome 21 is found, the baby has Down Syndrome.



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Neurological AIDS

Overview:

- Targets the nervous system alongside the immune system
- Infects glial cells that protect and support neurons
- Can cause shrinking of brain structures involved in learning and information processing
- Can still develop in individuals even after antiretroviral therapy (ART)

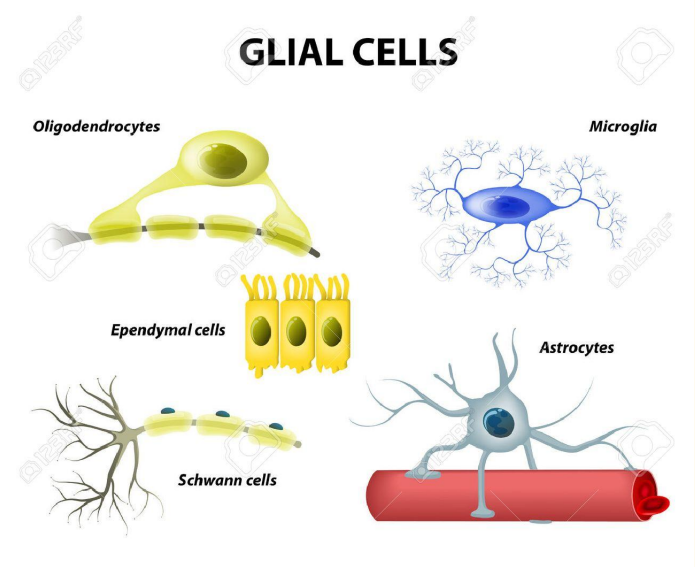

Photo courtesy of kidshealth.org

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Neurological AIDS

Symptoms:

- Mild difficulties with concentration and memory
- Struggles with decision-making and/or coordination
- Progressive, fatal dementia
- Leg weakness
- Loss of balance
- Seizures
- Strokes
- Vision loss

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Neurological AIDS

Diagnostic Tests:

- **Brain Imaging**: CT and MRI scans can reveal signs of brain inflammation, tumors, nerve damage, bleeding, and other abnormalities associated with this condition.
- **Electromyography**: To measure the electrical activity of the muscles and nerves.
- **Biopsy**: To examine a sample of tissues and to help find tumors in the brain or inflammation in the muscles.
- **Cerebrospinal Fluid Analysis:** To search for infections, bleeding, or other problems affecting the spinal cord or brain.

Tourette's Syndrome

Overview:

- Tourette’s Syndrome is a neurological disorder that begins in a person’s childhood. It involves repetitive moments called tics, which are unusual or unwanted sounds which cannot be controlled.
- The specific cause of Tourette’s remain unknown. However, heredity and genetics play a role in many occurences. Also, environmental, developmental, or other factors can also contribute to this disorder, but no specific agent has truly been identified.
- Tourette’s has been linked to the basal ganglia, which helps control body movements. Abnormalities in the basal ganglia can affect nerve cells and the chemicals that carry the messages between them, causing these tics to occur.

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Tourette's Syndrome

Symptoms:

- The main symptom of Tourette's is tics. People with Tourette's have at least 2 motor tics and 1 vocal tic. Stress and excitement can make these tics worse.
- Motor Tics
    - Eye blinking
    - Jerking
    - Shrugging
    - Jaw movements
    - Jumping
    - Kicking
- Vocal Tics
    - Grunting
    - Shouting
    - Repeating words

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Tourette's Syndrome

Diagnostic Tests:

- There isn't a specific diagnostic test for Tourette's. Instead, the doctor looks at the family history, medical history, symptoms, and does a medical exam, to try and diagnose patients.
- However, sometimes MRIs, CT scans, EEGs, or blood tests can help rule out other conditions that cause symptoms similar to Tourette's.

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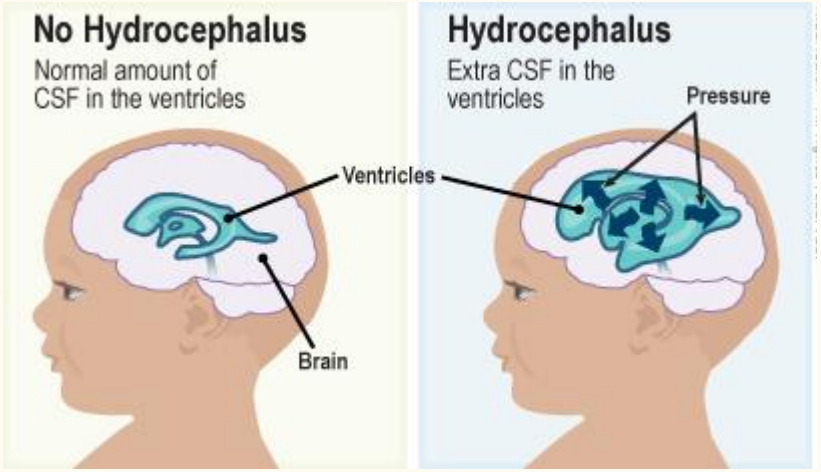
Hydrocephalus

Overview:

- A buildup of cerebrospinal fluid inside the skull that leads to brain swelling and damaged brain tissue
- Common in babies who have myelomeningocele, a birth defect in which the spinal column does not close properly.
- Most often occurs in infants and children.
- Without treatment, 6 out of 10 patients will the disease will die. Those who survive have varying amounts of disabilities. If treated, the life expectancy is normal.



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Hydrocephalus

Symptoms:

- Depend on age and the amount of brain damage
- In infants, the fontanelle (soft spot) bulge and the head becomes larger than expected
- Other symptoms include eyes that appear to gaze downward, irritability, seizures, separated sutures, sleepiness, vomiting.
- In older children, symptoms may include brief, shrill, high-pitched cries, changes in personality, memory, or the ability to reason or think, changes in facial appearance and eye spacing, crossed eyes or uncontrolled eye movements, headache, and urinary incontinence

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Hydrocephalus

Diagnostic Tests:

- The health-care provider will examine the baby.
- Repeated head circumference measurements may show that the head is getting bigger over time.
- A head CT scan is one of the best ways to identify hydrocephalus. Other tests include:
  - Arteriography
  - Brain scan using radioisotopes
  - Cranial ultrasound (an ultrasound of the brain)
  - Lumbar puncture and examination of the cerebrospinal fluid (rarely done)
  - Skull x-rays

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Cerebral Palsy

Overview:

- A group of neurological disorders that permanently affect body movement and muscle coordination
- Occurs when areas of the brain that control movement and posture develop incorrectly or get damaged
- Symptoms appear in infancy or early childhood
- Children with CP tend to have a typical lifespan of 30 to 70 years, however, constant physical/medical assistance may be necessary

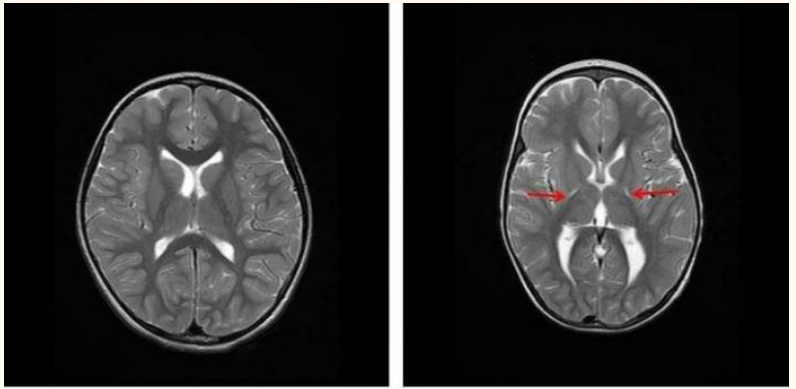

Fig. Radiological images show normal human brain anatomy versus affected from palsy.

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Cerebral Palsy

Symptoms:

- Symptoms can vary according to each individual, but most common ones include:
  - Lack of muscle coordination when performing voluntary movements (ataxia)
  - Stiff or tight muscles and exaggerated reflexes (spasticity)
  - Weakness in one or more arm or leg
  - Walking on the toes, a crouched gait, or a “scissored” gait
  - Variations in muscle tone, either too stiff or too floppy
  - Excessive drooling or difficulties swallowing or speaking
  - Shaking (tremor) or random involuntary movements
  - Delays in reaching motor skill milestones; and
  - Difficulty with precise movements such as writing or buttoning a shirt
  - Intellectual disability

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Cerebral Palsy

Diagnostic Tests:

- **Electroencephalogram**: a series of electrodes that are either taped or temporarily pasted on the scalp to detect changes in electrical activity in the brain.
- **Magnetic resonance imaging (MRI):** a computer-generated anatomical picture of the brain tissues and structures that show the location and type of damage in the brain.
- **Computed tomography (CT):** uses x-rays to create images that show the structure of the brain and the areas of damage.
- **Cranial ultrasound:** uses high-frequency sound waves to produce pictures of the brain, and is often used for high-risk premature infants because it is the least intrusive of the imaging techniques. Although it is not as successful as CT or MRI.

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Major Depressive Disorder

Overview:

- Leading cause of disability in the world.
- Strongly linked to low monoamine (norepinephrine, serotonin, dopamine) neurotransmitter levels.
- Individuals with a particular genotype that results in less serotonin transporter protein are more likely to develop depression, but only after stressful life events.
- More likely to affect young cohorts and females.
    - Females tend to have increased methylation of the serotonin transporter gene, further suggesting genetic factors.

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Major Depressive Disorder

Overview:

- Serotonin levels are possibly the result of increased tryptophan (precursor to serotonin) metabolism caused by elevated glucocorticoid levels.
- Elevated glucocorticoid levels also lead to increased release of glutamate, which causes excitotoxicity and degradation of neurons.
- Glucocorticoids are released during stress, suggesting that psychological and social factors lead to a biological disorder that results in depression.
- Depression might be the result of prolonged activation of the sympathetic nervous system and stress response.

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Major Depressive Disorder

Symptoms:

Psychological

- Freud believed that depression is a result of anger turned inward.
- Extreme grief without apparent stimulus.
    - Depressed individuals may hold delusional beliefs of extreme self-incompetence that are not true.
- Low self-esteem.
- Depressed individuals believe that they are unable to change their futures or take complete blame for failures in their lives.
    - Learned helplessness & external locus of control.

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Major Depressive Disorder

Symptoms:

Physical

- Extreme lethargy and lack of motivation
    - Complete exhaustion even when doing simple tasks
    - Decreased concentration, appetite, and energy
- Abnormal sleep cycles
- Suicidal ideation

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Major Depressive Disorder

Diagnostic Tests:

- According to Depression Scale Measurement-5, at least five of the nine potential symptoms must be exhibited for at least a two weeks:
    1. “Depressed mood…”
    2. “Markedly diminished interest or pleasure in all, or almost all, activities…”
    3. Unexplained weight loss/gain or change in appetite.
    4. Abnormal sleeping patterns.
    5. “Psychomotor agitation or retardation…”
    6. Constant fatigue.
    7. “Feelings of worthlessness or excessive or inappropriate guilt…”
    8. Diminished cognition.
    9. Obsession with death or suicide.

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Major Depressive Disorder

Diagnostic Tests:

- Recent research suggests that depression might be a result of the biological disorder, and these may be future diagnosis criteria
  - Elevated glucocorticoid levels
  - Elevated proinflammatory cytokine levels
  - Elevated glutamate levels
  - Low plasma tryptophan levels (relative to other amino acids)
  - Reduced hippocampal & grey matter volume

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